

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 656
MSDS Number: 656
SRM Name: Silicon Nitride Powders for
Quantitative Analysis by
Powder Diffraction

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Description: This Standard Reference Material (SRM) consists of two powders intended for quantitative analysis of the α and β polymorphs of silicon nitride via powder diffraction methods. The powders are combinations of the α and β polymorphs; one is high in the α phase content (α 656), while the other contains a larger amount of the β polymorph (β 656). A unit of SRM 656 consists of approximately 10 g of each powder.

Substance: Silicon Nitride.

Other Designations: Silicon Nitride (trisilicon tetranitride)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Registry	EC Number (EINECS)	Concentration (mass %)
Silicon Nitride	12033-89-5	234-796-8	100

Index, R/S Phrases (EC): Not determined.

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: Respiratory track irritation, suspected cancer hazard in animals.

Physical Hazards: Not applicable to the identified SRM.

Potential Health Effects (short term exposure)

Inhalation: Irritation to the mucous membranes and respiratory tract.

Skin Contact: Irritation.

Eye Contact: Irritation, visual disturbances, eye damage.

Ingestion: No information on significant adverse effects.

Listed as a Carcinogen/Potential Carcinogen

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X	
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)		X

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

Skin Contact: Wash affected skin with soap and water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: If a large amount is swallowed, get immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. Dust/air mixtures may ignite.

Extinguishing Media: Use extinguishing media appropriate for the surrounding fire.

Fire Fighting: Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): Not applicable. **Autoignition (°C):** Not applicable. **Method:** Not applicable.

Flammability Limits in Air (Volume %): Upper: Not applicable.

Lower: Not applicable.

Flammability Class (OSHA): Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Collect spilled material in appropriate container for proper disposal. Refer to Section 13 "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards.

Safe Handling Precautions: Use methods to minimize dust. See Section 8 "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Silicon Nitride

OSHA TWA: 5 mg/m³ (respirable fraction)

OSHA TWA: 15 mg/m³ (total dust)

ACGIH TWA: 10 mg/m³ (inhalable particulate)

ACGIH TWA: 3 mg/m³ (inhalable particulate)

Ventilation: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near of handling and use areas.

Personal Protection: Wear protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Silicon Nitride
Appearance and Odor: odorless white to gray powder
Molecular Formula: Si ₃ N ₄
Relative Molecular Mass: 140.3
Density (g/cm³): 3.4
Solubility in Water (%): insoluble
Solvent Solubility: soluble in hydrofluoric acid

10. STABILITY AND REACTIVITY

Stability: X Stable Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: Not applicable.

Fire/Explosion Information: See Section 5 "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition produces miscellaneous decomposition products.

Hazardous Polymerization: Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation Skin X Ingestion

Silicon Nitride

Carcinogen Status: NTP: Anticipated Human Carcinogen; IARC: Human Inadequate Evidence, Animal Sufficient Evidence, Group 2B. Inhalation studies in rats of both sexes revealed significant incidences of both benign and malignant tumors of the lung; a few mesotheliomas were also observed. An inhalation study in hamsters revealed a significant increase in the incidence of mesotheliomas. Intraperitoneal studies in both rats and hamsters revealed tumor incidence was related to fiber length and dose.

Health Effects (Acute Exposure)

Inhalation may cause irritation to the mucous membranes and respiratory disorders. Skin contact may cause irritation. Eye contact may cause irritation. No data is available for ingestion.

Medical Conditions Generally Aggravated by Exposure: Respiratory disorders.

12. ECOLOGICAL INFORMATION

Environmental Summary: Not available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated.

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE:	No
CHRONIC:	Yes
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Not regulated.

CANADIAN REGULATIONS

WHMIS Classification: Not determined.

EUROPEAN REGULATIONS

EC Classifications: Not determined.

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12(b), Export Notification: Not listed.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Silicon Nitride*, 16 September 2004.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.